

Application Filing Date: December 9, 2003

Attorney Docket No. 025219-442

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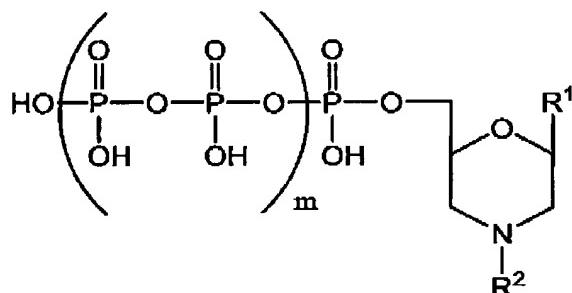
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Canceled).

Claim 2 (New): A morpholino-nucleotide of the formula:



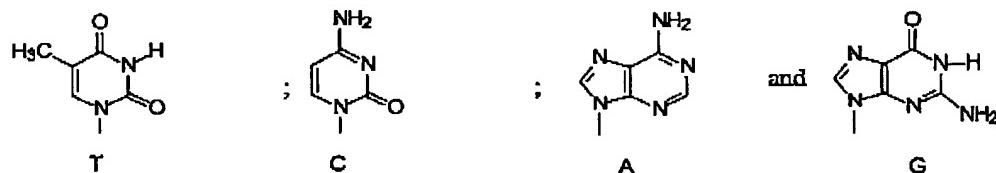
wherein R¹ represents a nucleic base, m is 0 or 1, and R² is selected from the group consisting of:

-(CH₂)_n-SR³, -(CH₂)_n-CO-R³, and -(CH₂)_n-OR³

in which n is an integer ranging from 1 to 12 and R³ is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.

Claim 3 (New): The morpholino-nucleotide of claim 2 wherein R¹ is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 4 (New): The morpholino-nucleotide of claim 2 wherein R¹ is selected from the group consisting of:



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Claim 5 (New): The morpholino-nucleotide of claim 2 wherein R³ is a label selected from the group consisting of radioactive products, luminescent products, electroluminescent and fluorescent products, and enzymatic labels.

Claim 6 (New): The morpholino-nucleotide of claim 5 wherein R¹ is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 7 (New): The morpholino-nucleotide of claim 2 wherein R³ is a fluorophore.

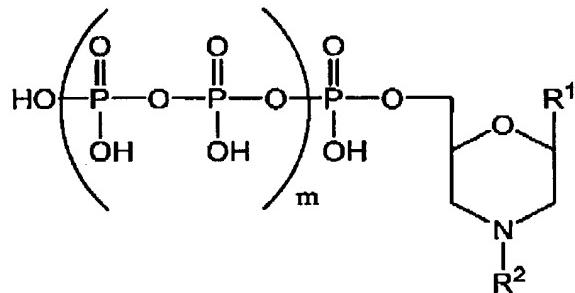
Claim 8 (New): The morpholino-nucleotide of claim 7 wherein R¹ is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 9 (New): The morpholino-nucleotide of claim 2 wherein R³ is selected from the group consisting of fluorescein, biotin, and rhodamine.

Claim 10 (New): The morpholino-nucleotide of claim 9 wherein R¹ is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine.

Claim 11 (New): The morpholino-nucleotide of claim 2 wherein m is 0.

Claim 12 (New): A morpholino-nucleotide of the formula:



wherein R¹ is a natural nucleic base selected from the group consisting of guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine; m is 0 or 1; and R² is selected from the group consisting of:

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Page 4 of 6 $-(CH_2)_n-NH-R^3$, $-(CH_2)_n-SR^3$, $-(CH_2)_n-CO-R^3$, and $-(CH_2)_n-OR^3$ in which n is an integer ranging from 1 to 12 and R^3 is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.

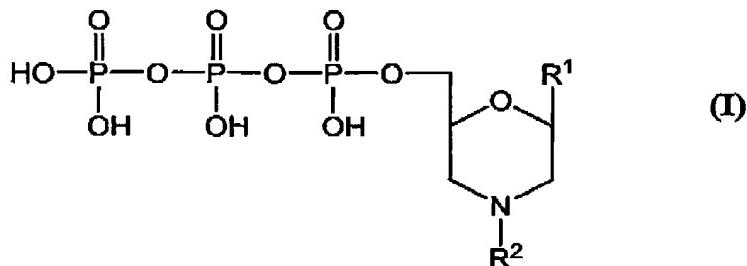
Claim 13 (New): The morpholino-nucleotide of claim 12 wherein R^3 is a label selected from the group consisting of radioactive products, luminescent products, electroluminescent and fluorescent products, and enzymatic labels.

Claim 14 (New): The morpholino-nucleotide of claim 12 wherein R^3 is a fluorophore.

Claim 15 (New): The morpholino-nucleotide of claim 12 wherein R^3 is selected from the group consisting of fluorescein, biotin, and rhodamine.

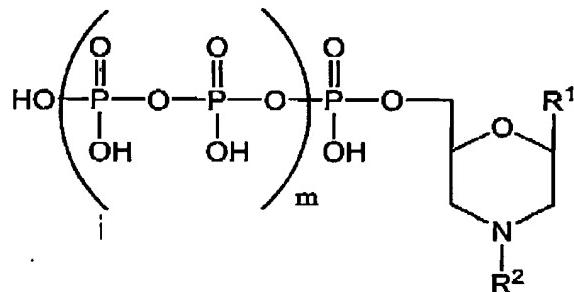
Claim 16 (New): The morpholino-nucleotide of claim 12 wherein m is 0.

Claim 17 (New): A morpholino-nucleotide of formula I:



wherein R^1 is a nucleic base selected from the group consisting of adenine, guanine, cytosine, and thymine; R^2 is $-(CH_2)_4-NH-R^3$; and R^3 is $-C(S)-NH$ -fluorescein.

Claim 18 (New): A morpholino-nucleotide of the formula:

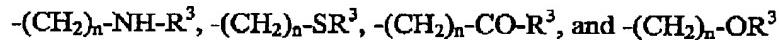


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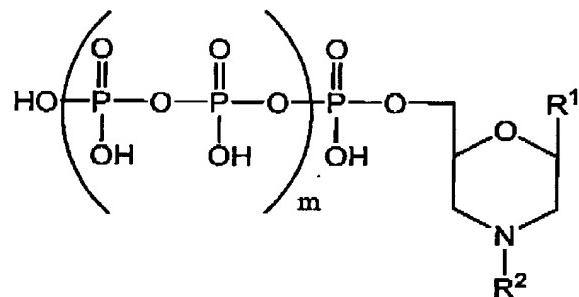
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wherein R¹ represents a nucleic base, m is 0 or 1, and R² is selected from the group consisting of:

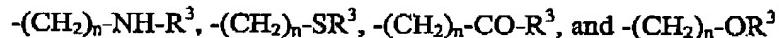


in which n is an integer ranging from 1 to 12 and R³ is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.

Claim 19 (New): A morpholino-nucleotide of the formula:



wherein R¹ is a natural nucleic base selected from the group consisting of adenine, guanine, cytosine, thymine, uracil, xanthine, hypoxanthine, and 2-aminopurine; m is 0 or 1; and R² is selected from the group consisting of:



in which n is an integer ranging from 1 to 12 and R³ is selected from the group consisting of a label, a protein, an enzyme, a fatty acid, and a peptide.